International Workshop "Digital Technologies for Teaching and Learning" (DTTL–2021)

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Abstract

We present a collection of selected materials from the International Seminar "Digital Teaching and Learning Technologies" (DTTL – 2021), which took place on March 22–28, 2021 in Kazan, Russia. The aim of this workshop is to bring together leading researchers in the field of intelligent learning systems, ontology modeling, educational software researchers interested in digital learning and learning technologies.

Keywords

Digital Teaching, Learning Technologies, DTTL–2021

1. Introduction

We are pleased to present a collection of selected materials to the International Seminar "Digital Teaching and Learning Technologies" (DTTL – 2021), which took place on March 22–28 2021 in Kazan (Volga Region) Federal University (Kazan, Russia).

The goal of this workshop is to bring together leading researchers from intelligent learning systems, ontology modeling, educational software researchers that are interested in digital technologies for teaching and learning. Its ultimate goal is to share knowledge, discuss open research questions, and inspire new paths.

The DTTL workshop will address the following topics:

- Digital resources for teaching and learning
- Ontologies in e-learning
- Intelligent learning systems
- New software for teaching and learning
- Mathematical models of learning
- Digital learning platforms
- Models and algorithms of educational data analysis
- Linked data in education.

The website of the workshop can be found here https://kpfu.ru/ifme/mezhdunarodnyj-forum-po-matematicheskomu-121594/dttl-workshop. A video recording of the event is avaialble upon request.

2. Program committee and reviewers

1. Natalia Loukachevitch, Dr.Sc., Lomonosov Moscow State University, Research Computing Center, Moscow, Russia.
2. Dmitry Lande, Dr.Sc., Institute for Information Recording, National Academy of Sciences of Ukraine, Kyiv, Ukraine.

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3. Olga Nevzorova, Cand.Sc., Kazan (Volga Region) Federal University, Institute of Information Technology and Intelligent Systems, Kazan, Russia.
4. Valery Solovyev, Dr.Sc., Kazan (Volga Region) Federal University, Leo Tolstoy Institute of Philology and Intercultural Communication, Kazan, Russia.
5. Alexander Elizarov, Dr.Sc., Kazan (Volga Region) Federal University, N.I. Lobachevskii Institute of Mathematics and Mechanics, Kazan, Russia.
6. Alexander Fridman, Dr.Sc., Institute for Informatics and Mathematical Modeling — subdivision of the Federal Research Centre "Kola Science Centre" of Russian Academy of Sciences, Russia.
7. Evgeny Lipachev, Cand.Sc., Kazan (Volga Region) Federal University, Institute of Information Technology and Intelligent Systems, Kazan, Russia.

3. Contributions

A peer-reviewed process was carried out to select the workshop papers. At least three members of the Program Committee with expertise in the area reviewed each paper. There were 29 papers submitted for peer-review to this workshop. Out of these, 10 papers were accepted for this volume, 2 as regular papers and 8 as short papers.

Falileeva and Shakirova presents a model of adaptive teaching of mathematics for students with different levels of subject training in mathematics. The principles of the didactic subsystem of the personalized digital model of teaching school mathematics made it possible to more effectively organize blended learning, in particular, the design of electronic courses for students with different levels of training.

Nevzorova et al. presents an extended model of the OntoMath^{Edu} educational mathematical ontology. The OntoMath^{Edu} ontology defines two projections representing the educational systems of Russia and of the UK. An important aspect of designing a projection is development of automatic and semi-automatic methods for replenishing the ontology with new concepts and relations, in particular, didactic ones.

Gatiatullin, Suleymanov et al. presents linguistic model of the frame ontology and "Turkic Morpheme" linguistic portal, which is built on the basis of this model.

Loukachevitch, Komissarov, Dobrov and Shternov in their article, propose an ontological approach to online vacancies. The ontology of science and technology is used as the main resource for automatic processing.

Medvedeva, Minnegalieva, Khairullina and Gilemzyanov present an approach to creating animation of a game character for a mobile application with augmented reality.

Medvedeva, Galeeva et al. describe the use of augmented reality technologies in the modern educational process in order to increase educational motivation, multimedia and interactivity of the lecture material.

Galimyanov et al. propose a method for the approximate solution of a fractional integro-differential equation, as well as assignments for students that can be used in offline and online learning.

Naidenova presents a method for constructing cognitive schemes of geometric configurations, formulating rules for transforming complete sentences into their elliptical variants and inverse transformations.

Naidenova, Kurbatov, Ganapolsky and Martirova identified linguistic and non-linguistic difficulties in understanding the texts of flat geometric problems: homonymy, ellipsis, ideographic synonymy, anaphora, quantifier expressions, syntactic lexemes and ambiguity of presentation.

Nikolaev, Nevzorova and Falileeva represent a digital educational ecosystem being developed as a component of a distance learning system based on LMS Moodle. The article also describes the generation of some types of school geometry problems based on the structure and concepts of the ontology of the same name, containing a slice of knowledge on planimetry.